WSTIAC

Volume 2, Number 1
January 2001

WEAPON SYSTEMS TECHNOLOGY INFORMATION ANALYSIS CENTER

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Moving Beyond the Rubber Bullet

by Major John D. Manley

Teddy Roosevelt's words from September 1901, "Speak softly and carry a big stick," crystallized much of America's 20th Century military policy. As we begin the 21st Century, however, it is clear that a variety of "sticks," large and small, are essential to succeed in the multifaceted missions assigned to today's military.

Because the nature of its deployment has dramatically changed since the end of the Cold War, answering the call to arms has become a more complex proposition to our nation's military. Humanitarian operations, small-scale contingencies and other operations other than war, coupled with an increasing number of noncombatants and civilians on the battlefield illustrate the necessity for an adaptable response to crisis across the spectrum of conflict. A major effort is now underway to develop the "sticks" a commander can call on to face any contingency with appropriate force.

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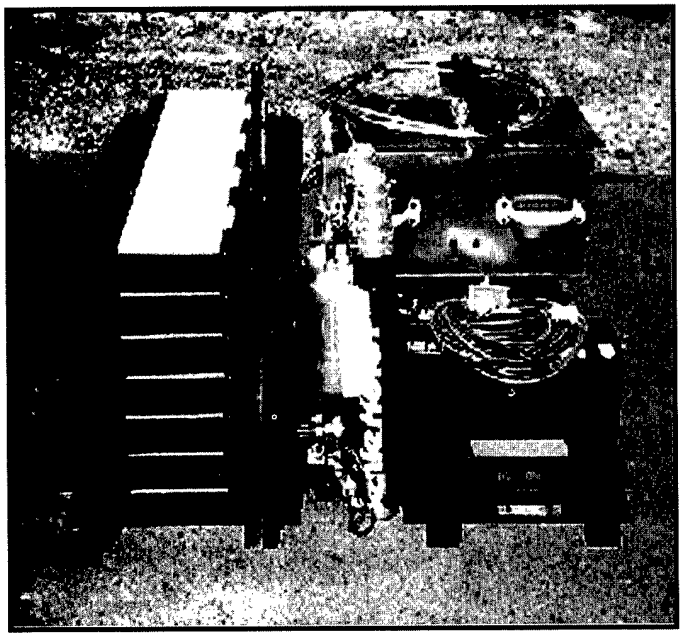
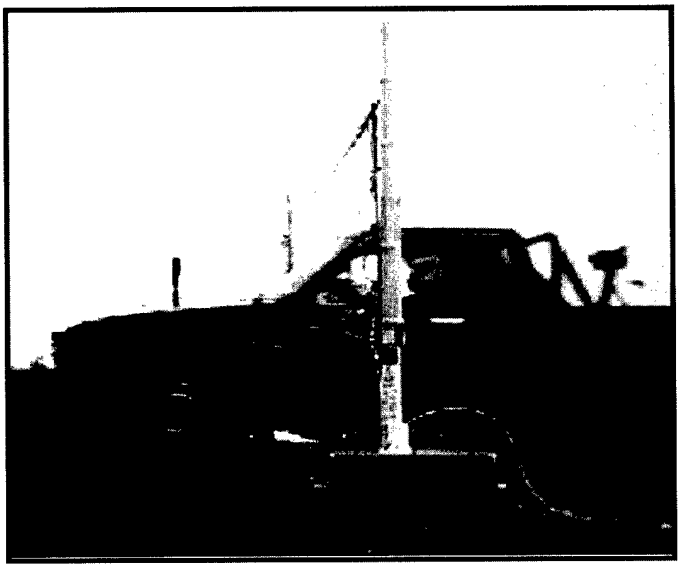
The Joint Non-Lethal Weapons Directorate (JNLWD) serves as the focal point for the research and development of non-lethal weapons (NLW) for the Department of Defense. The directorate, located at Quantico, Virginia, was established in 1997 after the Office of the Secretary of Defense designated the Commandant of the Marine Corps as Executive Agent for the NLW Program.



In the three years since standing up, the directorate has successfully guided several legacy programs through a production decision. Basic non-lethal capability sets are being fielded in the Marine Corps and the Army. In addition, it has coordinated and conducted rigorous testing and evaluation to weed out initiatives that did not live up to initial expectations, allowing the reallocation of resources to more promising programs.

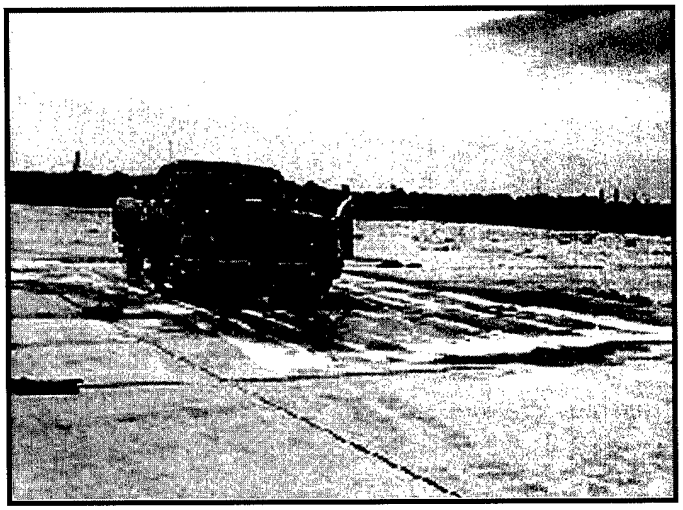


More recently, the directorate has conducted major initiatives on several fronts to lay a solid foundation on which to base the robust development of NLW technology. These efforts include:

– Conducting a six-month Joint Mission Area Analysis (JMAA) to reassess CINC needs for non-lethal capabilities. This effort has resulted in a draft Joint Mission Need Statement.

– Funding and coordinating seven Concept Exploration Programs to identify potential non-lethal technology to meet CINC needs as derived from the JMAA.

– Developing Operational and Strategic Level of War technology by leveraging ongoing research in directed energy to develop systems that will reduce collateral damage, deny areas to personnel and materiel and produce precision strike and non-lethal engagements from a distance.



Additionally, the JNLWD entered into exchange agreements with the United Kingdom and Israel to leverage NL research and technology advancements. Over the last year, the United States and the UK conducted a series of war games that culminated in a November 30, 2000 Executive Seminar of senior leadership (general officer) in London. This meeting allowed the leadership an opportunity to study commonality in NLW programs, areas of divergence and to assess the course of action to develop NLW in concert with our allies.

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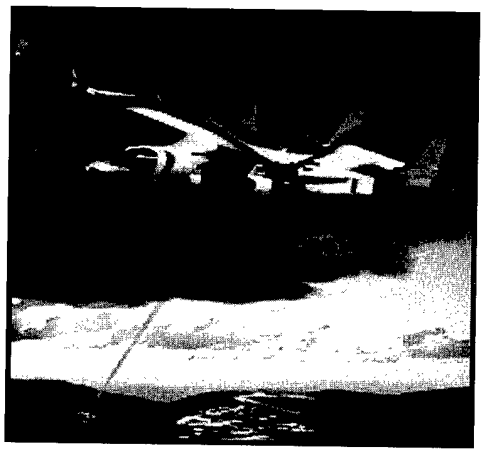
Finally, the JNLWD is beginning a two-year study to explore the measure of effectiveness of NLW for the North Atlantic Treaty Organization. This study, under the auspices of the Deputy Undersecretary of Defense for Science and Technology, will be a cornerstone in the future development and acceptance of NLW throughout the world. ♦

For more information, please contact: Major John Manley at (703) 784-2951 x240 (DSN 278), or manleyjd@mcsc.usmc.mil.



Internet Resources

This selected listing of internet sites provides additional resources about programs, activities, research, and products relating to various issues regarding nonlethal weapon technologies.

Note: *An extensive bibliography of current publications (1996-2000) is available free of charge from WSTIAC. The bibliography is unclassified, limited distribution (DoD and DoD contractors only). An abridged, unclassified/unlimited version is also available. Please contact WSTIAC at 703.933.3363 or email: vvalaitis@iitri.org.*

Joint Nonlethal Weapons Program
Joint Non-Lethal Weapons Program
http://iis.marcorsyscom.usmc.mil/jnlwd/
Joint Concept for Non-Lethal Weapons
http://www.concepts.quantico.usmc.mil/nonleth.htm
DOD Directive 3000.3 (Policy for Non-Lethal Weapons)
http://iis.marcorsyscom.usmc.mil/jnlwd/
NLW database
http://iis.marcorsyscom.usmc.mil/jnlwd/
Joint Non-Lethal Weapons Program Newsletter
http://iis.marcorsyscom.usmc.mil/jnlwd/

Army
Military Operations Concept For Nonlethal Capabilities In Army Operations TRADOC Pamphlet 525-73 C1
http://www-tradoc.army.mil/tpubs/pams/52573frm.htm
Non-Lethal Munitions
http://www.monmouth.army.mil/smc/pmpse/pages/forceprotection/nonlethm.html

Academic
The Institute for Non-Lethal Defense Technologies
Pennsylvania State University
http://www.nldt.org/index.html

Full Text Resources
Nonlethal Technology And Airpower A Winning Combination for Strategic Paralysis; Aerospace Power Chronicles, 1995
Maj Jonathan W. Klaaren, USAF, Maj Ronald S. Mitchell, USAF
http://www.airpower.maxwell.af.mil/airchronicles/apj/mitchkla.html
Nonlethal Weapons Technologies, Legalities, and Potential Policies Aerospace Power Chronicles, 1995
Maj Joseph W. Cook, III, Maj David P. Fiely, et. al.
http://www.airpower.maxwell.af.mil/airchronicles/apj/mcgowan.html

Nonlethality And American Land Power: Strategic Context And Operational Concepts
US Army Strategic Studies Institute Publication, 1998
Douglas C. Lovelace, Jr. Steven Metz
http://carlisle-www.army.mil/usassi/ssipubs/pubs98/nonlethl/nonlethl.htm

Nonlethal Weapons: A British View; Military Review, 1998
Robert Bunker
http://www-cgsc.army.mil/milrev/English/JulAug98/Review.htm

Nonlethality and American Land Power: Strategic Context and Operational Concepts
The Air Land Sea Application Center Publication, 1998
http://www.dtic.mil/alsa/nonlethal.htm

Nonlethal Technology And Fourth Epoch War
Proceedings of the DTC Test Technology Symposium, 1997
T. Lindsay Moore and Robert J. Bunker
http://www.dtc.army.mil/tts/proceed/nonlethl.html

Setting Our Weapons To Stun:The Ethics of "Nonlethal" Combat
Joint Services Conference on Professional Ethics XIX, 1997
Gordon L. Campbell
http://www.usafa.af.mil/jscope/JSCOPE97/Gordon97.htm

Conferences
NDIA Proceedings Non-Lethal Defense III
February 25-26, 1998
http://www.dtic.mil/ndia/nld3.html
NDIA Proceedings Non-Lethal Defense III
March 20-22, 2000
http://www.dtic.mil/ndia/nld4/index.html

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Reduced Lethality Weapons: Maintaining Proportionality

Warren H. Switzer, Ph.D.

In 1901, Mark Twain wrote of the American involvement in the Philippines:

> *"I thought we should act as their protector — not try to get them under our heel.... But now — why, we have got into a mess, a quagmire from which each fresh step renders the difficulty of extrication immensely greater."*

The same words could well apply to numerous situations in which the US is currently involved. Public concern over violence[1] and the fear of becoming involved in protracted, bloody, indecisive operations are heightened by a growing awareness of increasing involvement in complex, murky affairs wherein US national interests are not clearly defined. Less than fully satisfactory results have attended almost every major US involvement in the past decade.[2] Sadly, the US finds itself mired in places of grave danger, attempting to prop up or create environments for the inhabitants[3] wherein those same inhabitants often are the problem *and* the solution. This situation promotes the conundrum of needing to control a populace through less coercive means so that it may learn, aspire, evolve and transform itself into those "stable, self-supporting free-market oriented, democracies" which we see as the base material for a safer, more humane world. If the philosophy is that of enlightening the masses to the value of restraint,[4] it is necessary for those doing the enlightening to establish that environment with as little violence as possible and get on with their "enlightening".[5]

The obvious problem is that many of these places where US soldiers are posted for such duty have little remaining inclination with respect to restraint. Were the situation stable, US troops would not have been inserted. Unsurprisingly, US soldiers find themselves confronted with violence – often lethal violence – yet required to exercise considerable restraint. Moreover, since many of the issues generating distress lie at the core of the populace's physical or esoteric needs, desperation may impel the involvement of otherwise peaceful persons. Simultaneously, the resolution of those issues is beyond the military charter, set aside within the capabilities of the soldier or marine on the scene.

Over the past several years there has been a growing interest in so-called "non-lethal weapons." The creation of the NLW Program is unsurprising.[6] Indeed, since January 1997 there has been a Joint Non-Lethal Weapons Directorate located at Quantico, Virginia. The Non-Lethal Weapons (NLW) Program has as its objective:

> "...to establish a joint program built upon the Concepts-Based Requirements System (CBRS) and managed according to the Joint Service Memorandum of Agreement (MOA). The purpose of the NLW Program is to provide the most current and accurate information available on relative aspects of non-lethal technologies to the joint services and other government activities requiring the use of measured response in the performance of their mission. In addition, the program is to provide the Joint Chiefs of Staff and other responsible agencies with recommendations regarding the application of non-lethal technologies on a global basis from a comprehensive perspective, including research, development, tactics, training, and deployment of those technologies."[7]

Clearly, such conditions call for the use of highly effective but low lethality *tools*.

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[1] In actuality, it is the images of violence wherein Americans are seen (in those images) to be the direct causal agents of suffering that causes concern. The American public has been very tolerant of such damage or suffering being done "at a distance" – i.e., where Americans are not seen in the same photograph or videotape as the destruction (as in air strikes). While illogical, such reactions are understandable as it allows the viewer to separate the perpetrator from the act and simultaneously to relieve a measure of fear that US lives were and continue to be at (undue) risk.

[2] In fairness, this perception is, in part, a product of too many voices pronouncing what the US objectives are or ought to be (or have been) and then finding fault. The self-appointed umpires are many, the solvers of problems are few. Yet, there is a valid criticism that operations missing a clear articulation of objectives invite disparagement against which they are defenseless.

[3] There has been the almost maniacal belief that the American experiment can be transplanted everywhere and that the conditions that brought forth the success in North America are immediately present everywhere else. There seems to have been little consideration that revolutions may change the political masters of a nation, but cultures – what the people are – undergo evolution, not revolution. And evolution takes time.

[4] The examples of Bosnia, Kosovo, Somalia, Haiti, and Rwanda remain relatively fresh.

[5] During the age of imperialism, some nations were accused of "civilizing" the indigenous peoples through violence – i.e., that the methods gave the lie to the officially expressed motive.

[6] Obviously, there is public concern about violence, politicians react to what they believe the public expresses, and the services have responded with that activity they believe will assuage "political reality." The intrusion of the media, the so-called "CNN effect," coupled to sundry pundits who make a career of second guessing and "Monday morning quarterbacking" have created an insufferably burdened operational environment largely due to the inability or unwillingness of elected and appointed officials to assert their authority and accept responsibility.

[7] Joint Non-Lethal Weapons Program. "Joint Non-Lethal Weapons Program, 1997- A Year in Review," US Department of Defense, February, 1998, p. 2.

However, the focus has been on non-lethal *weapons*, which DoD Directive 3000.3 defines as:

> "Weapons that are explicitly designed to and primarily employed so as to incapacitate personnel and material, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. Unlike conventional lethal weapons that destroy their targets principally through blast, penetration, and fragmentation, non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons are intended to have one or both of the following characteristics. They have relatively reversible effect on personnel or material, They affect objects differently within their area of influence."

Significantly, the word "weapon" rather than "tool" is used. This suggests coercion, as the difference between the two is the psychological frame of influence. This seemingly small difference is an indicator of a predetermined and unfortunate frame of reference.

Weapons are most effective in the psychological realm, but their mode is in perceptions of the physical. It is more the perception of what the weapon(s) could do (often demonstrated), than what they have done, which forces a decision. That said, pain can cause a person to do, cease doing, or not do things from which they otherwise would not be dissuaded. Similarly, fear of death – perceived as the result of an opponent's use of a weapon – can have the same effects.[8]

All weapons[9] carry the risk of causing far more damage than "ordinary use" might logically indicate. Not only do the physical characteristics of individuals differ, the circumstances of the situation might make persons far more vulnerable than would otherwise be the case. For example, a rubber bullet or beanbag projectile at 20 meters is far less likely to cause serious injury than at a range of two meters. Similarly, a beanbag projectile or chemical agent of marginal stopping effectiveness when used against a 22-year-old muscular male could be lethal to an aged or very young person or one with some pre-existing medical condition. It is precisely the awareness of the danger of such unforeseen, uncontrollable, and perhaps unendurable effects that serves as a deterrent.[10] In short, there often is far more psychological "bang for the buck" with lethal than non-lethal weapons. The lack of such awareness can lead to unfortunate misadventures.[11]

The current emphasis has been at the tactical level – the level at which US soldiers are in direct contact with the people. Core capabilities are built around two themes, counterpersonnel and countermaterial. Yet, we should remember that so-called "non-lethal weapons" (actually tools) have been used for a very long time. However, most of these "non-lethals" were designed to enhance the effectiveness of lethal weapons or to reduce the effectiveness of enemy systems.[12] Indeed, drawing the line between weapons and non-weapons is very difficult.

For example, a night vision system can be used to aim a weapon or disclose an enemy attempt to conduct a surprise attack at night. And there are the negative applications. Jamming, and by that denying an enemy the use of information operations in a portion of the electromagnetic spectrum, can be crucial, yet the RF energy expended hardly is noticeable. More blunt are denial operations like blockades, particularly of foodstuffs, and passive denial operations such as embargoes, which often have similar effect.

Nor should any discussion of "non-lethal weapons" omit mention of their effectiveness in those complex operations lying below the threshold of general war. Ironically, many of these tools and the techniques for their use have been largely ignored despite a long history of effectiveness. Much of the current debate centers on low-level tactical tools and ignores larger, broader and demonstrably more effective applications.[13] The situation is analogous to developing a better ship's pumping system, but doing so while ignoring the development of better navigation and warning systems (which would remove many of the proximate causes for the need of such pumps).

In addition to mis-proportionate emphasis on the least effective tools, the lower the level of application the more the "non-lethal weapons" resembles and must function as a "weapon," i.e., must use coercive force to accomplish its end. Thus, the chance of misadventure is greater at the lower levels and the effectiveness, both for that incident and in terms of cascade effects, is reduced. Essentially, this means that the core reason for using reduced lethality weapons has the highest probability of being undone by focus at the lowest level of application. In short, it begs the question as to whether the current emphasis and proportionality of effort has been thought

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[8] In this, negative pressures win out over positive ones (inducements to pleasure) because the threat of death removes all possibility of future enjoyment. Only things valued more than death (e.g., protracted suffering followed inevitably by death, or in some cultures, shameful dishonor) makes death acceptable.

[9] Including the "non-lethals" of information operations, psychological warfare, electronic warfare, etc.

[10] The deterring effect initially is manifest on the rioters, but there also is an effect on those projecting the force. These effects are uneven at the individual level (usually reluctance on both parts) but generally polarizing at higher levels of organizations (such as there may be).

[11] The riot at Kent State, Ohio in the 1960's wherein naïve students egged on by radicals generated a lethal response from National Guardsmen sent to maintain order, is only one example of many. The so-called "Boston Massacre" (1770) is another. In both cases there seems to have been a belief that, "They wouldn't shoot." And, in both cases, the second order "cascade" effects were profound.

[12] A secret code, the management of intelligence, the use of information operations/warfare, the realm of electronic warfare all are themselves virtually devoid of being the direct physiological cause of death in the sense that are a bullet or bomb. Yet, no one would discount the value of these "non-lethal" tools in combat.

[13] For example, psychological operations undertaken by Allied forces in WW II were markedly effective in reducing German will to fight in certain cities and towns (e.g., Munich). Where such psychological operations were not attempted (e.g., Aachen) the results were very different. Similarly, if a defender is insensible to inducements to cease resistance because of his own propaganda, culture, or belief that to surrender is to be exterminated, resistance can be bitter and protracted, even if the eventual outcome is not in doubt (e.g., Warsaw and Manila).

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Internet Resources...

(Continued from page 3)

Department of Justice
National Institute of Justice Less than lethal program
http://www.ojp.usdoj.gov/nij/sciencetech/lessthan.htm
JUSTNET Justice Technology Information Network
http://www.nlectc.org/

United Kingdom
Centre for Conflict Resolution
Nonlethal Weapons Research Project
http://www.brad.ac.uk/acad/nlw/

Bibliographies
Nonlethal Weapons
Compiled by Joan Hyatt, Bibliographer
Air University Library Maxwell AFB, AL
http://www.au.af.mil/au/aul/bibs/soft/softkill.htm

Manufacturers and Suppliers
(The listing of a site does not constitute endorsement of the site or of the accuracy, adequacy, efficacy, or applicability of its content by the U.S. Government, IITRI, or WSTIAC. Users assume responsibility for the use, misuse, inability to use, or reliance on the information contained herein.)
ALS Technologies – Less lethal munitions
http://www.ozarkmtns.com/less-lethal/riot.htm
Guardian Protective Devices, Inc. – Riot control agents
http://www.guardpd.com/
Jaycor Less Than Lethal Technologies – Auto-Arrestor™ ultrasound imaging sensor; Sticky Shocker® Nonlethal Projectiles
http://www.jaycor.com/eme/ltlt.htm
Foster Miller, Inc. – Nonlethal Entanglement Technology Systems
http://www.foster-miller.com/policfr.htm
Tasertron – Electronic Immobilization Weapons
http://www.tasertron.com/
Combined Tactical Systems – Less lethal munitions
http://www.less-lethal.com/
MK Ballistic Systems – Less lethal ammunition
http://www.mkballisticsystems.com/index.htm
Hydro-Force Inc. – Less-lethal and non-lethal weaponry
http://www.hydroforceinc.com/
Chalen Enterprise – Air Taser
http://www.chalen.com/ch00023.htm
The Aqueous Foam Book
http://www.aquafoam.com/fb06.html ♦

Reduced Lethality Weapons...

Dr. Switzer *(Continued from page 5)*

through, or is merely a knee-jerk reaction to political fear of the media.

It becomes even more puzzling given the growing awareness of the need to conduct military operation in urban terrain (MOUT), wherein large numbers of non and semi- or irregular combatants will be involved.[14] Given the shrinkage of military force structure and budgets and the simultaneous expansion of missions, it seems doubtful that the expenditure of resources, especially time, at the lower levels of effectiveness is well proportioned. This is not to say that reduced lethality weapons are not needed, rather that there has been an overly great and mis-proportionate emphasis placed on developing them.[15]

And, even more basic that these considerations, there remains the open question of whether such development and general use belongs in the hands of civil law enforcement rather than in the military.[16] Certainly the pattern of success indicates that sustainable stability and the furthering of economic, political and social development has been better accomplished by other than military elements.[17] Those instances of protracted military presence and authority have not enjoyed success commensurate with protracted civil-centric programs.[18] Thus, the chief drawback to "non-lethal weapons" may not lie in their development, the mal-apportionment of resources, or their use, but in the questionable notion of who uses them. Again it begs the question of "Why the military?"

In sum, whatever means are used, the effect to be achieved is and can only be in the mind of the recipient. It seems the whole notion of "non-lethal weapons" should be rethought in terms of "reduced lethality tools," and, perhaps, a more fulsome appraisal of scale, emphasis and mission appropriateness is in order. ♦

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[14] The lessons learned from Sarajevo, Chechnya, and Somalia apply here.

[15] Indeed, the services have been reluctant to venture into an arena they see of marginal operational effectiveness and for which there likely will be an inordinate expenditure of energy and resources better invested/ expended elsewhere.

[16] In many areas of the world, the US use of its soldiers in what US officials term "stability operations" is perceived as imperialistic intrusion. US assertions to the contrary are debunked by the uniforms, demeanor and weapons seen by the locals and throughout the world in media coverage.

[17] For example, the Marshall Plan implemented in Europe (and elsewhere) after WW II was highly successful. The plan followed the pattern, after a short initial period of military government, of the rapid transition of authority and governmental process to US civil and local governmental entities. In short, after a period of restoring order, it was no longer a military mission.

[18] This has been the case for the US and virtually every other nation that adopted the military-centric pattern for another country.

FYI...

High Energy Laser Weapons

The Department of Defense announced that it would award $8.6 million in fiscal 2001 funds to support research into technologies that will advance the development of high-energy-laser weapons. The recipients were selected by the High Energy Laser Joint Technology Office, a new organization formed in June 2000 to manage a DoD-wide program to revitalize high-energy-laser science and technology research.

The announcement by Deputy Under Secretary of Defense for Science and Technology Delores Etter is the result of a highly competitive review of 56 proposals submitted by a diverse set of contractor organizations and academic institutions. The proposals were evaluated by a U.S. government team comprising technical experts from the Office of the Secretary of Defense, the military Services, and Defense agencies. The team selected 19 proposals for funding.

Project awards are being presented to the following investigators and organizations:

- Alexander A. Betin from Raytheon, El Segundo, Calif.
- Gon-Yen Shen from Raytheon, Danbury, Conn., (2 projects)
- Lloyd C. Brown from General Atomics, San Diego, Calif.
- Charles Clendening from TRW, Redondo Beach, Calif.
- Stephen C. Gottschalk from STI Optronics, Bellevue, Wash.
- Olga Kocharovskaya from Texas Engineering Experiment Station, College Station, Texas
- George R. Neil from the Department of Energy's Jefferson Laboratory, Newport News, Va.
- Rodney Petr from Science Research Laboratory, Somerville, Mass.
- David N. Plummer from Logicon, Albuquerque, N.M.
- Thomas Price from Xinetics, Devens, Mass.
- Fred Rigby from SAIC, Albuquerque, N.M.
- Wolfgang Rudolf from the University of New Mexico, Albuquerque, N.M.
- John Russell from the Directed Energy Professional Society, Albuquerque, N.M.
- Richard Schlecht from Lasergenics, San Jose, Calif.
- Peter Vorobieff from the University of New Mexico, Albuquerque, N.M.
- Robert E. Waldo from TRW, Redondo Beach, Calif.
- Michael Wickham from TRW, Redondo Beach, Calif.
- Luis E. Zapata from Lawrence Livermore National Laboratory, Livermore, Calif.

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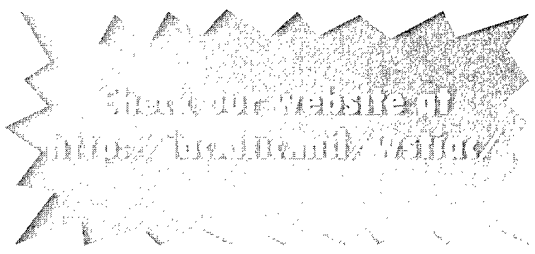

WSTIAC

Director/Chief Scientist's Corner

A View from Washington

By Dr. Wes Kitchens

In the last issue of the *WSTIAC Newsletter* I discussed Joint Vision 2020 and its four operational concepts: dominant maneuver, precision engagement, focused logistics and full-dimensional protection. These are powerful operational concepts, but unfortunately, our potential adversaries can also adopt them and use them against us. We are already seeing this happen as threat missiles and long-range guns are being made highly mobile. This trend will undoubtedly continue since fixed weapon systems make relatively easy targets for modern U.S. precision-guided weapons that rely on inertial navigation and global positioning systems. The set of targets we will face in future conflicts is expected to be capable of breaking down and relocating in minutes. Finding, identifying and tracking time critical and mobile targets, planning strikes against them, and attacking and destroying them will require timely intelligence, as well as new types of weapon systems that are better suited for this very stressing mission.

The DoD currently has a number of time critical targeting initiatives underway to improve our capability to successfully engage time critical and mobile targets. Two conferences held in October 2000 in the Washington, DC area: "Time Critical Targeting Conference," sponsored by the Association of Old Crows and ASD(C3I), and "Precision Strike Technology Symposium – Integrating Technology for Time Critical Operations," sponsored by the Precision Strike Association and the Association for Unmanned Vehicle Systems International – Capital Chapter, highlighted some of the

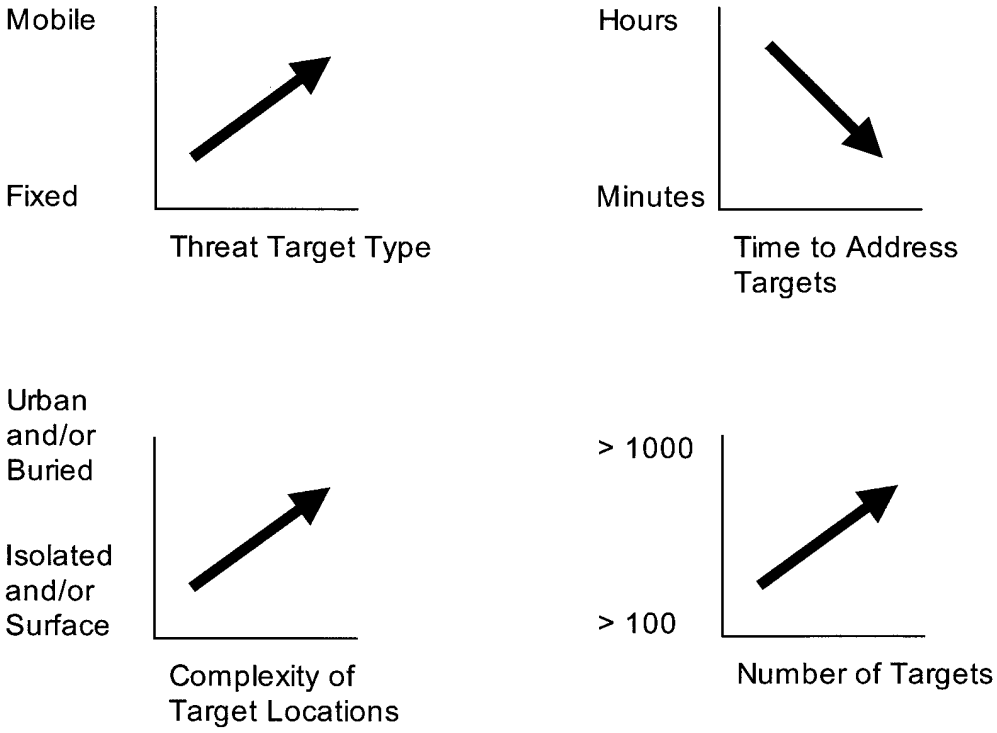

Figure 1. Targeting Trends

Director/Chief Scientist's **Corner**

complex issues associated with locating, identifying, tracking, attacking and defeating time-critical and mobile targets.

Targeting trends are illustrated in Figure 1, adopted from a presentation at the Precision Strike Technology Symposium by Lt Col John Boylan (USAF) of the National Imagery and Mapping Agency (NIMA). The time required to address targets is now being measured in minutes, targets are being buried and/or located in urban terrain, and the number of potential targets that must be dealt with is in the thousands. Clearly, the targeting problem has become more difficult. CDR Spencer Miller, U.S. Navy, PMA 258, NAVAIR, offered his thoughts at this Symposium about what will be required to engage and destroy moving targets. He outlined a need to develop radars that can provide target quality output from long standoff ranges, create high speed target imaging and mission planning tools, and develop a standoff weapon that can receive in-flight updates in real time. Such standoff weapons will need to be able to link with either the shooter, another off-board sensor tracking the target, or both. In effect, the weapon system itself will need to become an integrated part of the attack network. COL Kenneth Dobeck, Director, Joint Precision Strike Demonstration Project Office described four joint Service efforts that are helping to improve and demonstrate an adverse weather, all day/night, end-to-end, sensor-to-shooter precision strike capability to locate, identify and eliminate high-value, short dwell targets and assess damage within tactically meaningful timelines. These efforts include the Theater Precision Strike Operations Advanced Concept Technology Demonstrator (ACTD), the Rapid Terrain Visualization ACTD, the Joint Continuous Strike Environment ACTD and the Joint Intelligence, Surveillance and Reconnaissance ACTD. These and related programs aimed at defeating time critical and mobile targets will all help make Joint Vision 2020 a reality.

This issue of the WSTIAC Newsletter features two articles on non-lethal weapons. We are grateful to Mrs. Susan Levine, Deputy Director for Technology, Joint Non-Lethal Weapons Directorate, for contributing an overview of the Joint Non-Lethal Weapons Program written by Major John Manley and to Dr. Warren Switzer of the IIT Research Institute for contributing an essay discussing the use of non-lethal weapons. We welcome your feedback about the WSTIAC Newsletter and solicit your suggestions for future topics you would like to see included. You can reach me by Email at wkitchens@iitri.org or by phone at (703) 933-3317. ♦

WSTIAC Wants Your Contributions

- We hope you find this issue of the *WSTIAC Newsletter* useful and interesting. You can help us to better serve you by your contributions, such as:
- Your comments on what you liked and disliked about the Newsletter
- Your suggestions for WSTIAC data products and services
- Technical articles, opinion pieces, tutorials, news releases or letters to the Editor for publication in the Newsletter
- To contact WSTIAC, use any of the ways listed on the back cover, or use the feedback form on the WSTIAC webpage
- We welcome your contributions.

WSTIAC

Smart Weapons Training Seminar

Huntsville, Alabama
13-15 March 2001 and 21-23 August 2001
(Seminar starts at 8:00 AM Tuesday and ends at 12:00 PM Thursday.)

Seminar Scope: The Weapon Systems Technology Information Analysis Center (WSTIAC) developed this 2½ day Smart Weapons Training Seminar to provide a comprehensive understanding of smart weapons and related technologies. This seminar is aimed at providing general knowledge about smart weapons technology and a source of current information on selected U.S. and foreign smart weapons, to include system description, concept of employment, performance characteristics, effectiveness and program status.

Seminar Objectives: The seminar's objective is to inform materiel and combat developers, systems analysts, scientists, engineers, managers and business developers about smart weapons to include: State of the art of representative U.S. and foreign smart weapon systems; Employment concepts; Smart weapons related systems, subsystems, and technologies; and Technology trends.

Seminar Sponsors:

- AMC Smart Weapons Management Office (AMC-SWMO)
- Defense Technical Information Center (DTIC)
- Joint Technical Coordinating Group Munitions Effectiveness (Smart Munitions Working Group)

About the Seminar: This seminar was originally developed for the U.S. Army Command and General Staff College in Fort Leavenworth, Kansas. It has proven to be enormously popular with attendees from both government and industry. The seminar is updated annually to include current information about the latest technology and capability upgrades being made to representative US and foreign smart weapon systems. Instructors include: Dr. Wes Kitchens, WSTIAC Director and former DDR&E Director for Weapons Technologies; Mr. Mark Scott and Mr. Hunter Chockley, IITRI Science Advisors; Mr. Ron Funderburk IITRI Research Engineer and retired US Army Colonel; and Mr. Mike Holthus, foreign weapons expert at the National Ground Intelligence Center.

Security Classification: The security classification of this seminar is SECRET (U.S. Citizens Only).

Fee: The registration fee for this 2½ day seminar is $950 for US government personnel and $1150 for government contractors. Contractor teams of 3 or more, registered at the same time, are charged $950 per person.

Registration: Attendance is limited to 35 people and the seminars generally fill up fast. Please complete and return the attached registration form and forward your security clearance information as soon as possible to guarantee a seat. All registrations will be acknowledged, and each attendee will be sent an agenda, maps, and directions to the seminar site.

Smart Weapons Training Seminar Offered at Your Location

WSTIAC can conduct its 2½ day Smart Weapons Training Seminar at your location during 2001 to reduce your travel time and cost. This seminar has been presented to hundreds of students over the past decade. This is a very cost effective way to provide smart weapons training to up to 35 people at your site. ♦

Please call Mrs. Shirley Hardy at (256) 382-4756 or email shardy@iitri.org for more information and a brochure with seminar details.

FYI...

(Continued from page 7)

The selected projects will explore physics and technology in a wide range of areas relevant to high-energy-laser weapons, including chemical lasers, solid-state lasers, free-electron lasers, adaptive optics, and the interaction of laser beams with target materials. ♦

More information on the High Energy Laser program can be found at http://www.dtic.mil/dusdst/JTO_newsletter.html.

Calendar of Events

Upcoming Conferences and Courses

13-14 February 2001
UAV/UCAV Payloads Conference
U.S. Army Research Lab
Adelphi, MD
For additional information
Tel: 1-888 OLD-CROW Email: info@crows.org

14-15 February 2001
Defense Reform 2001 Conference & Exhibit
Washington, DC
For additional information call
703/264-7500 or 800/639-2422
Email: custserv@aiaa.org
http://www.aiaa.org/calendar/DR01prog.html

28 February-2 March 2001
2001 AUSA Winter Symposium and Exhibition
"Partnering for the Future"
Fort Lauderdale, FL
For additional information contact Leigh McMillan
Tel: 703-907-2661
E-mail: lmcmillan@ausa.org
http://www.ausa.org/

13-15 March 2001
The Tactical Situational Awareness (SA) Symposium
San Diego, CA
For additional information call 301.342.9268
Email: HeffnerPL@navair.navy.mil
http://pma202.navair.navy.mil/sas/

20-22 March 2001
Undersea Warfare Division Spring Conference
Space and Naval Warfare Systems Center
San Diego, CA
For additional information Email: kwilliams@ndia.org
http://register.ndia.org/interview/register.ndia?~Brochure~126

25-26 March 2001
Vulnerability of Ballistic Missiles to Direct Hit Warhead Technology
Short Course $775
Laurel, MD
Phone: 800/639-AIAA (U.S. only), 703/264-7500
Fax: 703/264-7551
E-mail: custserv@aiaa.org
http://www.aiaa.org/calendar/index.html

26-29 March 2001
National Summit on US Defense Policy:
Acquisition, Research, Test and Evaluation
Hyatt Regency Hotel
Long Beach, CA
For additional information Email: pedmonson@ndia.org
http://register.ndia.org/interview/register.ndia?~Brochure~1910

9-12 April 2001
36th Gun & Ammunition Symposium
San Diego, CA
For additional information
Email: djenks@ndia.org
http://register.ndia.org/interview/register.ndia?~Brochure~159

14-16 May 2001
Missiles & Rockets
Weapon System Effectiveness
San Antonio, TX
For additional information: Email pedmonson@ndia.org
http://register.ndia.org/interview/register.ndia?~Brochure~1630

28-30 May-2001
8th St. Petersburg International Conference on Integrated Navigation Systems
Call for Papers
St. Petersburg, Russia
Contact: Dr. George Schmidt 617/258-3841

12-14 June 2001
69th MORSS
Sailing Into a New Millennium
US Naval Academy Annapolis, MD
WSTIAC NEWSLETTER, 4th Quarter 2000
http://www.mors.org/

18-10 June 2001
Future Combat Systems Conference
Parsippany, NJ
For additional informationdjenks@ndia.org
http://register.ndia.org/interview/register.ndia?~Brochure~1600

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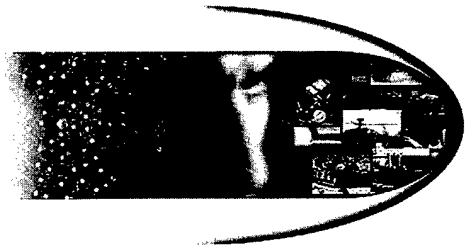
Information Request



Please return this form to...
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ATTN: Publication Department
215 Wynn Drive, Suite 101
Huntsville, AL 35805

or fax...

256.382.4701

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